What is claimed is:

1. A method for high throughput processing of a plurality of droplets, the method comprising:

a) dispensing the plurality of droplets onto a substantially unperforated surface; and

b) moving the surface through a delay line such that each droplet hangs from the surface for at least a specified minimum period of time, the droplet adhering to the surface by virtue, at least in part, of surface attraction.

2. A method according to claim 1, wherein the step of dispensing droplets includes limiting each droplet to a specified volume smaller than one microliter.

3. A method according to claim 1, wherein dispensing each droplet onto the surface includes dispensing each droplet while the surface is moving.

4. A method according to claim 1, wherein moving the surface through a delay line includes moving the surface via a pulley system.

5. A method according to claim 1, wherein moving the surface through a delay line includes moving the surface around a drum.

6. A method according to claim 1, wherein moving the surface through the delay line includes hanging each droplet beneath the surface.

7. A method according to claim 1, wherein moving the surface through the delay line includes exposing each droplet to a controlled environment.

8. A method according to claim 1, further comprising a step of analyzing a characteristic of each droplet.

9. A method of high throughput processing of a plurality of droplets, the method comprising:

a) dispensing each droplet onto a moving surface; and

b) tracking each droplet's position.

10. A method according to claim 9, wherein the moving surface moves continuously.

11. A method according to claim 9, wherein the moving surface moves in a discontinuous start/stop action.

12. A method according to claim 9, wherein dispensing the droplet onto the moving surface includes:

a) providing one or more microtiter plates to a microtiter plate handling system;

b) providing data that identifies each microtiter plate's position to the microtiter plate handling system;

c) commanding the microtiter plate handling system to retrieve a particular microtiter plate; and

d) presenting a particular plate for dispensing.

13. A method according to claim 9, wherein tracking each droplet's position includes measuring and recording each droplet's position on the moving surface using a position sensor, such that each droplet is associated with a fiducial position on the moving surface.

14. A method according to claim 13 wherein the position sensor is a rotary encoder.

15. A method according to claim 13, wherein the steps of measuring and recording occur at substantially the same time each droplet is dispensed onto the moving surface.

16. A method according to claim 13, wherein recording each droplet's position includes saving each droplet's position in random-access memory.

17. A method according to claim 13, wherein tracking each droplet's position includes:

a) detecting each droplet using a drop sensor, the drop sensor at a known position relative to the position sensor; and

b) verifying that the known position corresponds to each droplet's position based on the fiducial position and position information obtained from the position sensor at each droplet's time of detection.

18. A method according to claim 17, wherein the drop sensor is located at an interface to an analyzer.

19. A method according to claim 17, wherein the drop sensor is located at a substrate station.

20. A method according to claim 17, wherein the drop sensor is located at a reactant station.

21. A method according to claim 17, further comprising:

a) recording a failure if the known position does not correspond to each droplet's position based on the fiducial position and position information obtained from the position sensor at time of detection.

22. A method according to claim 9, wherein tracking each droplet's position includes using a drop sensor to detect each droplet.

23. A method according to claim 13, further comprising:

a) dispensing a particular droplet with known analytical properties onto the moving surface; and

b) verifying position and identity of the particular droplet, wherein verifying includes:

i) analyzing the particular droplet at a known position relative to the fiducial position so as to obtain analyzed properties,

ii) comparing the particular droplet's analyzed properties with the particular droplet's known analytical properties,

iii) comparing the known position against the particular droplet's position as derived from the position sensor.

24. A method according to claim 9 further comprising subjecting each droplet to a controlled environment.

25. A method according to claim 24, wherein subjecting each droplet to a controlled environment includes hanging each droplet from the moving surface for at least some period of time, each droplet adhering to the moving surface through, at least in part, surface attraction.

26. A method according to claim 24, further comprising transporting each droplet, via the moving surface, through an environmentally controlled delay line.

27. A method according to claim 9, further comprising performing at least one operation on each droplet from the group of operations consisting of mixing, diluting, concentrating, filtering, and analyzing.

28. A method according to claim 27, wherein analyzing includes performing at least one operation from the group of operations consisting of optical interrogation and mass spectrometry.

29. A method according to claim 28, wherein optical interrogation includes at least one of fluorescence spectrometry, Raman spectroscopy and UV absorption.

30. A method according to claim 27, wherein analyzing the content of each droplet includes:

a) aspirating each droplet into a dispensing unit; and

b) presenting each droplet for analysis via the dispensing unit.

31. A method according to claim 30, wherein presenting each droplet for analysis includes:

a) presenting each droplet to a mass spectrometer; and

b) determining a characteristic of each droplet by means of mass spectrometry.

32. A method according to claim 27, wherein analyzing a characteristic of each droplet includes:

a) heating each droplet so as to form an atomized spray; and

b) determining a characteristic each droplet by means of mass spectrometry.

33. A method according to claim 27, wherein analyzing a characteristic of each droplet includes:

a) applying a pneumatic force to each droplet so as to form an atomized spray; and

b) determining a characteristic of each droplet by means of mass spectrometry.

34. A method according to claim 27, wherein analyzing a characteristic of each droplet includes:

a) applying an explosive force to each droplet so as to form an atomized spray; and

b) determining a characteristic of each droplet by means of mass spectrometry.

35. A method according to claim 27, wherein analyzing a characteristic of each droplet includes:

a) vibrating each droplet so as to cause atomization; and
b) determining a characteristic of each droplet by means of mass spectrometry.

36. A method according to claim 35, wherein vibrating the droplet includes focusing a pulsed laser onto the surface in a proximity of each droplet.

37. A method according to claim 35, wherein vibrating each droplet includes focusing a pulsed laser onto the backside of the surface onto which each droplet has been deposited.

38. A method according to claim 35, wherein vibrating each droplet includes utilizing acoustic waves.

39. A method according to claim 35, wherein vibrating each droplet includes mechanically vibrating the surface.

40. A method according to claim 35, further comprising applying a voltage to the surface onto which each droplet is deposited to assist in the formation of atomized spray.

41. A method according to claim 9, further comprising spooling a laminate onto the moving surface prior to dispensing each droplet onto the moving surface.

42. A method according to claim 41, further comprising spooling the laminate off of the moving surface after performing at least one operation on each droplet.

43. A method according to claim 41, further comprising customizing at least one surface property of the laminate from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity,

chemical interaction, chemical addition, sample information encoding, and tracking.

44. A method according to claim 9, wherein the step of dispensing includes limiting each droplet to a specified volume smaller than one microliter.

45. A method of high throughput processing of a plurality of droplets, the method comprising:

a) hanging each droplet from a dispenser;

b) bringing each droplet into momentary contact with a moving surface having a probe, such that each droplet is deposited onto the probe through surface attraction;

c) applying an alternating current to the probe so as to cause the probe to vibrate such that each droplet is atomized; and

d) analyzing a characteristic of each droplet.

46. A method of high throughput processing of a plurality of droplets, the method comprising:

a) dispensing each droplet into an enclosed volume, the enclosed volume having an exit channel, the enclosed volume incorporated into a moving conveyer;

b) heating each droplet in the enclosed volume such that the expansion of the droplet causes it to be ejected through the exit channel in the form of an atomized spray; and

c) analyzing a characteristic of the atomized spray by means of mass spectrometry.

47. A method for high throughput processing of a plurality of droplets, the method comprising:

a) spooling a laminate onto a moving surface;

b) dispensing each droplet onto the laminate; and

c) performing on each droplet at least one operation from the group of operations consisting of mixing, diluting, concentration, heating, cooling, humidifying, filtering, and analyzing.

48. A method according to claim 47 wherein the step of spooling includes depositing the laminate onto a conveyor belt.

49. A method according to claim 48, further comprising spooling the laminate off the moving surface.

50. A method according to claim 49, further comprising:

a) cleaning the laminate; and

b) repeating the steps of spooling the laminate onto the moving surface, dispensing, performing on each droplet at least one operation, and spooling the laminate off the moving surface.

51. A method according to claim 49, further comprising disposing the laminate.

52. A method according to claim 47, further comprising customizing at least one surface property of the laminate from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking.

53. A method according to claim 47, wherein the laminate is magnetic and the droplet includes magnetized particles.

54. A method according to claim 47, further comprising subjecting each droplet to a controlled environment.

55. A method according to claim 54, wherein subjecting the at least one droplet to a controlled environment includes hanging the droplet from the laminate for

at least a specified minimum period of time, the droplet adhering to the laminate through, at least in part, surface tension.

56. A method according to claim 54, further comprising transporting the droplet on the laminate, by virtue of motion of the movable surface, through an environmentally controlled delay line prior to performing the at least one operation on each droplet.

57. A method according to claim 47, wherein the moving surface moves continuously.

58. A method according to claim 47, wherein the moving surface moves in a discontinuous start/stop action.

59. A method according to claim 47, wherein analyzing includes performing at least one operation from the group of operations consisting of optical interrogation and mass spectrometry.

60. A method according to claim 59, wherein the step of analyzing includes applying at least one of fluorescence spectrometry, Raman spectroscopy and UV absorption.

61. A method according to claim 59, wherein analyzing includes hanging each droplet from the laminate for at least some period of time, the droplet adhering to the laminate through, at least in part, surface tension.

62. A method according to claim 47, further comprising tracking each droplet on the moving surface.

63. A method according to claim 62, wherein tracking each droplet includes using at least one sensor from the group of sensors consisting of a position sensor and a drop sensor.

64. A system for high throughput processing of a plurality of droplets, the system comprising:

a) a movable surface that is substantially unperforated;

b) a dispenser for dispensing each droplet onto the surface; and

c) a delay line for moving the surface such that the each droplet hangs from the surface for at least a specified minimum period of time, the droplet adhering to the surface by virtue , at least in part, of surface attraction.

65. A system according to claim 64, wherein each droplet has a volume smaller than one microliter.

66. A system according to claim 64, wherein the movable surface moves continuously.

67. A system according to claim 64, wherein the movable surface moves in a discontinuous start/stop action.

68. A system according to claim 64, wherein the delay line includes a pulley system such that the surface moves back and forth in a confined area.

69. A system according to claim 64, wherein the delay line includes a drum that rotates, such that the surface travels around the drum in a confined area.

70. A system according to claim 64, wherein the delay line includes an environmental chamber, for subjecting the droplet dispensed on the surface to a controlled environment.

71. A system according to claim 64, wherein the surface has at least one customized surface property from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking.

72. A system according to claim 64, further including an analyzer, for analyzing a characteristic of each droplet.

73. A system according to claim 72, wherein the analyzer is a mass spectrometer.

74. A system according to claim 64, wherein the moving surface is a conveyor belt.

75. A system according to claim 64, further comprising a laminate that is spooled onto the moving surface, such that the droplet is dispensed onto the laminate.

76. A system of high throughput processing of a plurality of droplets, the system comprising:

a) a moving surface;

b) a dispenser for dispensing each droplet onto the moving surface; and

c) a tracking system for tracking each droplet's position.

77. A system according to claim 76, wherein the moving surface moves continuously.

78. A system according to claim 76, wherein the moving surface moves in a discontinuous start/stop motion.

79. A system according to claim 76, further including a microtiter plate handling system for receiving data identifying at least one micotiter plate, retrieving a particular microtiter plate based on a received command, and presenting the particular plate for dispensing.

80. A system according to claim 76, wherein the tracking system includes a recorder, for measuring and recording information pertaining to each droplet's position on the moving surface.

81. A system according to claim 80, wherein the recorder includes random-access memory.

82. A system according to claim 76, wherein the tracking system includes a position sensor for associating each droplet with a fiducial position on the moving surface.

83. A system according to claim 82, wherein the position sensor is a rotary encoder.

84. A system according to claim 82, wherein the tracking system includes at least one drop sensor.

85. A system according to claim 84, wherein the at least one drop sensor is positioned at a known position such that upon the at least one drop sensor detecting each droplet, the known position can be verified against each droplet's fiducial position and position information obtained from the position sensor at each droplet's time of detection.

86. A system according to claim 85, wherein the at least one drop sensor is located at an interface to an analyzer.

87. A system according to claim 85, wherein the at least one drop sensor is located at a substrate station.

88. A system according to claim 85, wherein the at least one drop sensor is located at a reactant station.

89. A system according to claim 76, wherein the tracking system includes at least one drop sensor.

90. A system according to claim 76, further including an environmental chamber, for subjecting the droplet dispensed on the surface to a controlled environment.

91. A system according to claim 90, wherein the environmental chamber includes a delay line.

92. A system according to claim 91, wherein the delay line includes a pulley system such that the moving surface moves back and forth in a confined area.

93. A system according to claim 91, wherein the delay line includes a drum that rotates, such that the moving surface travels around the drum in a confined area.

94. A system according to claim 86, further including an analyzer for determining a characteristic of each droplet.

95. A system according to claim 94, further comprising an aspirator for aspirating each droplet into the dispensing unit, whereupon each droplet is presented to the analyzer via the dispensing unit.

96. A system according to claim 94, wherein the analyzer is a mass spectrometer.

97. A system according to claim 96, further including a means for rapidly heating each droplet so as to form an ionized spray.

98. A system according to claim 96, further including a laser for rapidly heating each droplet so as to form an ionized spray.

99. A system according to claim 96, further including a means for applying a pneumatic force to each droplet so as to form an atomized spray.

100. A system according to claim 96, further including a piston for applying a pneumatic force to each droplet so as to form an atomized spray.

101. A system according to claim 96, further including a means for applying an explosive force to each droplet so as to form an atomized spray.

102. A system according to claim 96, further including a means for vibrating each droplet so as to form an atomized spray.

103. A system according to claim 96, further including a pulsed laser for focusing onto the surface in a proximity of the droplet so as to vibrate the droplet and cause atomization.

104. A system according to claim 96, further including a probe for vibrating the droplet so as to cause atomization, the probe moving rapidly back and forth in response to an alternating current.

105. A system according to claim 94, wherein the analyzer includes means for an optical analyzer.

106. A system according to claim 76, wherein the moving surface is a conveyor belt.

107. A system according to claim 76, wherein the moving surface is a fiber.

108. A system according to claim 76, wherein the moving surface is a timing belt.

109. A system according to claim 76, wherein the moving surface is unperforated.

110. A system according to claim 76, further comprising a laminate which is spooled onto the moving surface, such that each droplet is dispensed onto the laminate.

111. A system according to claim 76, wherein the laminate has at least one customized surface property from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking.

112. A system according to claim 76, wherein each droplet has a volume smaller than one microliter.

113. A system for high throughput processing of a plurality of droplets, the system comprising:

a) a moving surface;

b) a laminate spooled to the moving surface;

c) a dispenser, for dispensing each droplet onto the laminate; and

d) a means for performing on each droplet at least one operation from the group of operations consisting of mixing, diluting, concentrating, heating, cooling, humidifying, filtering, and analyzing.

114. A system according to claim 113 further including a first spool for spooling the laminate onto the moving surface.

115. A system according to claim 114 further including a second spool for spooling the laminate off of the moving surface.

116. A system according to claim 113, wherein the means for performing includes an environmental chamber, for subjecting each droplet dispensed on the laminate to a controlled environment.

117. A system according to claim 116, wherein the environmental chamber includes a delay line.

118. A system according to claim 117, wherein the controlled delay line includes an enclosed pulley system, such that the laminate travels back and forth in the environmental chamber.

119. A system according to claim 117, wherein the delay line includes a drum that rotates, such that the laminate travels around the drum in the environmental chamber.

120. A system according to claim 113, wherein the laminate has at least one customized surface property from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking.

121. A system according to claim 113, wherein the laminate is magnetized.

122. A system according to claim 113, wherein the moving surface is a conveyor belt.

123. A system according to claim 113, wherein the moving surface is a timing belt.

124. A system according to claim 113, further including a drop sensor for detecting each droplet.

125. A system according to claim 113, wherein the moving surface moves continuously.

126. A system according to claim 113, wherein the moving surface moves in a discontinuous start/stop motion.

127. A system according to claim 113, wherein the laminate is unperforated.

128. A system according to claim 113, wherein the means for performing includes a mass spectrometer.

129. A method for high throughput processing of a plurality of droplets, the method comprising:

a) dispensing the plurality of droplets onto a substantially unperforated surface; and

b) moving the surface through a delay line such that each droplet hangs from the surface for at least a period of time, wherein the force acting to counter gravity is predominantly non-shearing.

130. A system for high throughput processing of a plurality of droplets, the system comprising:

a) a movable surface that is substantially unperforated;

b) a dispenser for dispensing each droplet onto the surface; and

c) a delay line such that each droplet hangs from the surface for a period of time, wherein the force acting to counter gravity is predominantly non-shearing.